DRAFT

GUIDELINES FOR THE PREPARATION

OF AN ENVIRONMENTAL IMPACT STATEMENT

FOR

SLAVE RIVER HYDROELECTRIC

POWER DEVELOPMENT

ENVIRONMENTAL ASSESSMENT PANEL

OTTAWA, ONTARIO

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1.0 INTRODUCTION

The Environmental Assessment and Review Process (EARP) of the Government of Canada requires that proposed projects, programs and activities, involving Federal government funds or property, and which are likely to have significant environmental effects, be submitted to an Environmental Assessment Panel for review. This is to ensure that a project is assessed early in its planning before committments are made. The Panel is formed under the authority of the Minister of the Environment and will review an Environmental Impact Statement (EIS) and other relevant documents. The EIS is prepared by the Proponent (company or government undertaking the project) and is submitted by an initiator department (federal agency obligated by EARP) to the Panel.

These guidelines have been prepared in order that the environmental impact and mitigation measures of the proposed Slave River Hydroelectric Project can be determined. In January 1980, Parks Canada referred the Slave River project to the Minister of the Environment for a Panel review under the EARP process. In referring the proposal Parks Canada identified concerns about the alteration of water levels in the Peace Athabasca Delta, flooding in the Slave River Valley behind the proposed control structure and the effects of transmission lines and associated maintenance roads on Whooping Cranes and their habitat. Other areas of interest in the project relate to concerns about fisheries impacts, downstream effects, traditional land use and outstanding land claims.

The Proponent should observe the intent rather than the letter of the guidelines and identify and describe all environmental impacts likely to arise from the Project, even for those situations not explicitly identified in these guidelines. Any changes in these guidelines are to be approved by the Environmental Assessment Panel prior to implementation.

When completed, the EIS will be reviewed by the Panel and made available for review and comment by the public and government agencies. There will then be public meetings for interested parties to present their views to the Panel on the environmental aspects of the proposed Project. Representatives of the Proponent company should attend these meetings to answer questions about subjects dealt with in the EIS.

The EIS and its review by the public and technical agencies provide the Panel with the information base necessary to prepare its report to the Minister.

These guidelines may include matters which, in the view of the Proponent, are not relevant or significant to the project or to the study area. This should be so indicated by the Proponent in the EIS. The public and technical agencies will have the opportunity to comment upon this. Where the Panel disagrees with the Proponent's statements in this regard, then the Panel may require additional information from the Proponent before proceeding with the review.

2.0 DEFINITIONS

Environmental Assessment Panel (Panel):

- an independent group of specialists appointed to review the environmental effects of the Project for the federal government.

Environmental Impact Statement (EIS):

- a documented assessment of the environmental effects of a proposed project or activity which may have significant environmental consequences. It is prepared early in the planning stages of development by the Proponent in accordance with Guidelines established by the Panel undertaking the review.

Initiator:

- a federal department or agency which intends to undertake, sponsor or assume federal government responsibility for the review of a project having possible environmental effects and which is thereby required to take appropriate action according to the Federal Environmental Assessment and Review Process.

Proponent:

- a company, province or federal agency which intends to undertake a project, or group of projects having possible environmental effects.

Project:

- the construction of hydroelectric generating facilities on the Slave River near the Alberta - Northwest Territories boundary, including associated transmission lines and roads.

Project Area:

- all areas potentially affected, both permanently and temporarily, by the construction and operation of the Project including but not limited to:
  1. Wood Buffalo National Park
  2. Slave River Delta
  3. Slave River
  4. Peace Athabasca Delta
  5. Lake Athabasca

Associated Projects:

- construction, transportation or other projects that would be undertaken in support of or in addition to the subject project which would occur as a direct result of the initiation of the Project.

3.0 PREPARATION OF THE ENVIRONMENTAL IMPACT STATEMENT (EIS)

The Proponent will be responsible for the preparation of an EIS with sufficient copies for review by the Panel, the public and government

agencies. The number of copies required shall depend upon anticipated demand and shall be determined at the time of publication. A summary should be prepared as a document separable from the EIS for wide distribution by the Proponent, Initiator and Panel. It should be written in such a manner as to allow reviewers to focus immediately on items of concern. It should be written in terms understandable by the general public and in a format that allows it to be extracted directly for publication by the media if this is required, or for use by senior executives requiring a quick appraisal of the situation.

An outline of the contents of the summary is included in section 10.0. The main document will contain more detailed information as outlined in sections 4.0 to 9.0.

4.0 DEMAND, ALTERNATIVES AND ASSOCIATED PROJECTS

The principal purpose of this section is to clearly identify the objectives of the project. It should convey the expected future demand for electricity and what other feasible alternatives have been considered to meet the demand. It should also describe the way in which this project conforms to and interacts with other general planning and activities in the surrounding area.

4.1 The Need for the Project

The Proponent should establish the need for the Project and demonstrate the necessity through a comparison with other feasible alternatives. These should include:

a) Coal fired generation in Alberta

b) The Western Power Grid

c) Greater integration with the B.C. Hydro system

d) Nuclear energy

e) Conservation

f) Soft energy paths

The Proponent should prepare a cost/benefit analysis of these alternatives to the proposed project with the potential beneficiaries defined as:

a) Local

b) Provincial (Alberta)

c) National

In discussing the demand and proposed timing for the project the Proponent should include a comparison and discussion of the different load forecasts.

4.2 Alternative Configurations

If alternative development modes or configurations are being considered, the Proponent should provide a description and

environmental analysis of each. The discussion of alternatives should give sufficient detail to permit the reviewer to compare the costs, benefits, environmental risks, and social and economic impact of each. The analysis of alternatives would include the alternatives of no-development and postponement.

4.3 Associated Projects and Developments

The Proponent should assess the relationship of the proposed Project to other existing or proposed developments in the project area. This assessment should include the biophysical and socio-economic interactions with other developments. Activities over which the Initiator and the Proponent do not have control, but which may interact with the proposal, should be included in the studies especially if the project under review will have the effect of stimulating or accelerating these other proposals. For instance, if an all-weather road from Fort McMurray to Fort Chipewyan or Fort Smith is essential to the project the changes to lifestyles and communities in the presence of such a road should be discussed. In particular the discussion should include an assessment of the environmental impact of such a road on Wood Buffalo National Park and environmental and socio-economic impact on traditional, cultural and social activities of the area.

5.0 THE PROJECT PROPOSAL

This section should include a description of the preferred development option for the Slave River Hydroelectric project. It should describe the magnitude (scope) of the project and proposed schedule for development.

The criteria for the selection of the preferred development option should be presented in terms of other alternatives considered by the Proponents. Factors common to all alternative means of completing the proposal should be described in addition to the factors peculiar to individual alternatives.

5.1 General Layout

The E.I.S. should include detailed maps at a scale in the range of 1:50,000 to 1:100,000 showing all the factors which have a bearing on the selection of the preferred option and potential alternatives. The maps should show:

a) Delineation of terrain units and geographic features.

b) Wildlife habitat with particular reference to buffalo and waterfowl. Significant seasonal use such as summer, winter, calving and rutting range of the buffalo should be delineated as well as nesting and feeding areas for waterfowl. Other significant wildlife habitat should also be identified.

c) Existing access roads and trails; access or all-weather roads required for the preferred option and alternatives.

d) Population centres (eg. Communities, Indian band settlements) and other existing or proposed developments and activities (eg. Wood Buffalo National Park, historic sites, archaeological sites, traplines, mining or industrial developments, including oilsands projects).

e) All temporary and permanent, existing and proposed transmission systems and routes, construction sites, workers' housing or campsites, borrow and waste disposal areas, water and fuel supply areas and other ancillary facilities.

Diagrams and descriptions of the proposed dam facilities should be provided including such items as dykes, spillways, coffer dams, power facilities, intake and discharge channels and structures, proposed fish passage facilities, and spawning channels.

Comparative maps of the proposed reservoir area(s) before and after reservoir filling should be provided. The location(s) of dykes and/or control dams should be noted and where diversions are proposed, maps should indicate these features maps should also show the full storage level and the level of normal draw-down (e.g. operating level fluctuations).

5.2 Site Preparation and Construction Details

The following subjects should be addressed:

a) The construction schedule of each phase of the proposed Project;

b) site preparation and construction methods to be used, particularly those which could have a harmful effect on the environment such as placing and removing coffer dams, placement of containment dykes and the method of maintaining drainage behind them, dredging, clear-cutting, diversion techniques, earth removal, and blasting;

c) types, volumes, location, timing and method of aquisition of local construction materials and services;

d) location of access roads, increased use of existing roads and transportation facilities;

e) effluents and emissions (e.g. water, air, noise) in terms of quantity and characteristics caused by or attributable to site preparation and construction;

f) plans for environmental surveillance and monitoring during construction and an associated plan for contingency response to environmental emergencies;

g) location, size, duration and services of construction camps and the impact on local communities.

5.3 Operation and Maintenance

The following subjects should be addressed in the EIS:

a) The commissioning techniques and their anticipated effects;
b) quantities, control and disposal of waste materials produced by operation and maintenance programs of this project;
c) emissions creating ice fog and noise;
d) anticipated mode of operation including schedule of water discharges and reservoir storage;
e) a plan for environmental surveillance and monitoring during operation;
f) size and extent of operational staff housing and the impact on local municipal services.

5.4 Abandonment

The plans for abandonment of all structures after useful life should be discussed in the EIS if such plans can reasonably be expected to have been made. This should include the rehabilitation of disturbed areas such as campsites, borrowpits, supply dumps, access roads, etc. in all phases of the project.

6.0 DESCRIPTION OF EXISTING ENVIRONMENT AND RESOURCE USE

Section 6.0 should describe the baseline natural and socio-economic environment in the Project area as it exists prior to Project development with emphasis on those elements that are likely to be

significantly affected. Where knowledge gaps exist, these should be noted. A description of present resource use should also be included and illustrated by maps, graphs or charts.

The intent of this section is to provide the foundation for impact predictions. It should not provide a lengthy, in-depth description of all aspects of the physical, biological and socio-economic environment.

6.1 Climate and Air Quality

This section should provide a quantitative description of climatic elements of the Project Area including:

a) the long-term means and extremes of temperature, precipitation, wind speed and direction, average depths of snow cover throughout the year;
b) the frequency of temperature inversions, fog, smoke, haze, freezing precipitation and thunderstorms.

The location of recording stations should be noted along with the length of time that recorded observations have been kept.

6.2 Terrain

The information should be described and also presented on maps of 1:50,000 to 1:100,000 scale and should include:

a) topography (with appropriate contours), landforms, surficial geology, bedrock geology, major soil types;

b) terrain stability and seismic risk;

c) special, sensitive, or unique geological or landform features;

d) extent and characteristics of permafrost.

6.3 Hydrology and Limnology

Describe important parameters of ground and surface waters in the Project area:

a) physical, chemical and biological parameters such as:

1. temperature
2. flow rate
3. water table height
4. physical, chemical and biological analysis
5. river levels
6. fish food likely to be affected by the Project

The normal seasonal variations and expected maxima and minima of these parameters should also be discussed.

b) water quality immediately upstream of the proposed project and in the downstream reaches in which impact is to be expected;

c) duration and extent of ice cover, including a general discussion of the features and progression of ice breakup.

6.4 Vegetation

Identify and describe the plant life in the Project Area:

a) map biogeoclimatic zones, forest cover and plant communities;
b) describe plant communities by species and common names, indicate relative abundance, importance to man and importance to native fauna as habitat and food;
c) undisturbed, rare or unique vegetation; plant life of special economic, historic, social or scenic value.

6.5 Fish and Wildlife

Describe:

a) the relative seasonal abundance and distribution within the Project Area of those species of fish, amphibians, reptiles, birds and mammals considered to be of significance with respect to their sport, commercial, scientific, ecological or aesthetic value (listed by common and scientific names);
b) rare or endangered species and critical habitat which may be affected in the Project Area;
c) location of fish spawning beds, migration patterns and timings;

d) other areas critical to the life cycle of important fish species in terms of nursery habitat and feeding areas; an identification of fish food likely to be affected by the project should also be included;

e) present harvest of fish with reference to level of activities and catches by recreational, domestic and commercial fishing;

f) waterfowl breeding, feeding, moulting and staging areas including timing, location and estimated numbers;

g) areas important to the life cycles of wildlife and birds such as migration routes and critical feeding areas including seasonal use;

h) present harvest of waterfowl, upland game birds, ungulates and furbearers.

6.6 Land, Water and Resource Use

Describe the nature, extent and location of present and projected land and resource utilization. Reference to land classifications made under the relevant land inventory should be made where possible.

a) forestry: raw material use, types of production;

b) mining: past sites, present claims, areas presently being exploited or under feasibility study;

c) wilderness and recreational: provincial or national parks, areas administered by conservation authorities, game

preserves, ecological reserves, other recreational areas (e.g. camping, picnicking, sport fishing/hunting);

d) traditional: hunting, fishing, trapping;

e) residential, commercial and industrial land use;

f) archaeological, historic, and scenic land use sites;

g) ownership: public, private, or special status.

6.7 Socio-economic Environment

The Proponent should describe and discuss the following factors in relation to the mixed population of the area (ie. White, Indian and Metis):

a) the social, economic, and cultural profile of communities in the Project Area. Emphasis should be placed on those elements of the population which would be most affected by the proposal;

b) population distribution (including seasonal fluctuations if relevant), employment, health and educational facilities and housing within the Project area;

7.0 ENVIRONMENTAL AND SOCIAL IMPACTS AND MITIGATING MEASURES

7.1 ENVIRONMENTAL

This section should describe and compare the expected environmental impacts of any alternatives that are being considered with emphasis on

those actions which are likely to cause major environmental disruptions. In particular the Proponent should address the proposed Project's impact on Wood Buffalo National Park, indian lands, Lake Athabasca, the Peace Athabasca and Slave Deltas, and the upstream and downstream river regime. The assessment of short-and long-term potential impacts should be made on the basis of information collected from existing sources supplemented by field data. Where factual data are unavailable or of questionable quality, the report should clearly state that the predicted effect(s) is based on subjective judgement and that knowledge gaps exist.

Treatment of impacts should cover the preconstruction, construction, operation and abandonment phases of the project.

The impacts should be categorized as direct and indirect. For example, impacts directly attributable to the project would include river bank slumping and loss of habitat. Secondary activities such as increased resource use and recreational demand are considered indirect impacts. Estimated duration of the impacts should be specified.

In addition to the identification of significant effects, an investigation and discussion of options and measures to avoid, minimize, mitigate or compenste for harmful effects should be included. Enhancement of beneficial effects should be noted.

The Environmental Impacts Section should include those actions that will result in irreversible and irretrievable commitments of the

resources, including those in the reservoir area and downstream. Detailed attention should be given to:

a) establishment of controlled flow releases in terms of volume and timing;
b) completed diagrams and descriptions of mitigation facilities such as fishways, intake screening devices or compensatory artificial fish production systems;
c) modification to operating schedules to facilitate fish and wildlife production and maintenance;
d) measures to prevent the introduction of the parasitic lamprey into the upper Slave, Peace and Athabasca drainages;
e) impacts with regard to transmission lines and access roads;

7.1.1 Climate and Air Quality

The type and size of a reservoir may lead to some changes in the local and downstream climate. These changes may eventually result in a modification of local terrestrial ecosystems. The Proponent should discuss changes that might occur in:

a) precipitation rates; for example the distributions of convective showers and snow flurries may be affected by the new reservoir;
b) the extent of ice cover on waterways and the timing of freeze-up and break-up;

c) fog and ice fog intensities; these may be affected by the project or by related changes in population and land use;

d) evaporation rates, for example when a new reservoir is created;

e) local winds and air quality may be affected by the project itself or related developments.

7.1.2 Terrain

The surrounding land could be affected significantly by the creation of a reservoir, construction techniques or improved access. Some of the common environmental factors that could be affected by any or all of the project functions and which should be addressed here are:

a) geological stability as affected by the increased loading of reservoir waters;

b) bank stability and erosion with particular attention to the Fort Smith area and new shoreline areas;

c) the removal of surficial material during construction and operation;

d) unique landforms, historical, archaeological and paleontological sites;

e) mineral resources;

f) detailed description of projected new shoreline of the reservoir for each alternative scheme;

g) detailed geologic mapping to assess potential reservoir leakage through Karstic bedrock.

7.1.3. Hydrology and Limnology

Almost all project activities can have an effect on ground and surface water.

The more important qualities that might be altered by the activities of the project and which should be discussed are:

a) water quality during construction;
b) water quality during operation and maintenance, including potential nitrogen supersaturation problems downstream from dam spillway;
c) drainage patterns and runoff rates;
d) groundwater hydrology;
e) unique physical features, such as rapids or falls;
f) sedimentation rates and distribution of sediment;
g) permafrost degradation;
h) quantities of water as affected by diversions in or out of a waterway;
i) changes expected in winter freeze-up and spring break-up dates;
j) downstream and upstream effects during and after construction of the dam in terms of water quality (changes in water temperature, chemical composition, nutrient levels, sedimentation and erosion patterns and distribution).

7.1.4 Vegetation

Changes in the natural plant communities occur with changes in the area's climate, terrain and hydrological regime. These changes include:

a) species distribution and abundance;
b) the introduction of exotics;
c) the destruction of unique associations;
d) the loss or gain of key habitats for fish and wildlife;
e) the consequences of clearing or leaving trees in the reservoir area;
f) logging operations associated with 7.1.5 (f) with alternatives and costs.

7.1.5 Fish and Wildlife

The project will have a variety of effects on fish and wildlife. Some will be recognizable in fish and wildlife populations and some will affect micro-organisms that form much of the basic food chain.

The following are some of the important characteristics to be considered especially with regard to waterfowl, muskrats, bison, and fish:

a) changes in diversity and numbers;
b) the introduction of exotics;

c) the loss, reduction or impact on rare or endangered species; especially the Whooping Crane, White Pelican and Wood Bison;

d) the disruption of food chains including loss of feeding habitat;

e) increased exploitation;

f) upstream effects if flooded area is left with standing timber - in relation to future suitability for fisheries and wildlife;

g) detailed inventory of suitable spawning and rearing habitat in reservoirs and tributaries;

h) an inventory, supported by field data collections, of all species of fish occurring in significant numbers during the different seasons of the year in the Slave River and its major tributaries above and below Smith Rapids. This inventory should include the identification of species, information on life histories and residence time, the timing of migratory runs, and the present and potential use of the species by man;

i) baseline information on the physical and chemical limnology of the Slave River and its major tributaries;

j) currently used spawning grounds in the main river and in all significant accessible tributaries above and below Smith Rapids should be located and quantified in order to assess potential losses;

k) current use of the main river and all significant tributaires above and below Smith Rapids as nursery and rearing area by all species of fish occurring in significant numbers;

l) as assessment is also needed of the present use by fish of currently inaccessible tributaries in order to provide an estimate of potential use in the future to offset any losses in the main stem;

m) the degree of obstruction to anadromous fish caused by Smith Rapids and any other falls on the Slave River;

n) an assessment of the possibility of introduction of Arctic lamprey upstream of the damsite and the potential impact on subsistence and commercial fisheries;

o) the possibility of introduction of fish parasites upstream of the proposed damsite and the impact on subsistence and commercial fisheries.

p) the impacts of reservoir configurations and fluctuations on nesting and staging areas for waterfowl, on habitat for water related mammals, particularly muskrat and beaver, and on grassland habitat and bison range. Where new habitat suitable for these species will be created its location, extent and capacity should be identified.

7.1.6 Land, Water and Resource Use

A water related project can either expand or contract the land, water and resource use of an area by providing easier access or flooding useful land and resources. The results could be significant to the indigenous population of the area.

Consideration should be given to some of the more important factors such as:

a) present and projected land use;

b) present and projected resource exploitation;

c) transportation;

d) industrial activity;

e) changes in aesthetic and/or recreational opportunities which may be caused by the construction or operation of the Project (items such as additional noise and visual aspects should be included in this section);

f) effect on Wood Buffalo National Park, archaeological and historic sites prior to and during the pre-construction, construction phase, and procedures designed for the preservation of such sites;

g) municipal and regional development plans and proposed master Park plans for Wood Buffalo National Park;

h) seasonal effects of the Project on downstream accessibility to the east side of the Slave River.

7.2 Socio-economic Environment

Potentially significant effects on the social environment (including related economic factors) should be described and analyzed in this section. The Proponent should identify the methods and extent of local consultation which has been obtained in preparing this section. The EIS should be written to consider the mixed population of the area and should identify both positive and negative changes for the three main groups of popele (White, Indian and Mētis) affected in terms of the degree of impact.

The EIS should also discuss the social impact of the Project if:

1. the Project goes ahead,
2. the Project does not go ahead,
3. it is implemented in an alternative manner.

The socio-economic environment to be addressed should include, but should not be limited to, the direct and indirect effects of location, construction, operation and abandonment of the Project within the Project area including:

a) changes to the social, economic and cultural patterns and values in existing communities or settlements;
b) changes in employment patterns in the region including any changes in traditional resource use by the existing communities;
c) changes in population size, composition and distribution in the area both permanently and temporarily, as a result of direct or indirect consequences of the Project and the implications of the changes;
d) the impact of the Project on established native rights and unsettled treaty entitlements.

7.3 Other Impacts

If other significant impacts not explicitly mentioned in these Guidelines are identified by the Proponent in the preparation of

the EIS, the Proponent should address these impacts in the EIS and set forth proposed mitigation measures.

Mitigation measures for alternative project configurations should be discussed so that various costs and benefits associated with each can be evaluated.

8.0 RESIDUAL IMPACTS

The environmental impacts that remain after all practical mitigating measures have been incorporated into the proposals must be quantified and discussed in terms of the nature, extent and duration of all such impacts on the environment and the implications to regional, local and site-specific interests.

Should further information be required to fully assess a particular impact and to provide for its mitigation, the Proponent should propose studies to obtain information necessary for completing the assessment.

9.0 MONITORING

Plans for monitoring the Project's effects as a result of the detailed analysis of environmental concerns should be described. This should include a discussion of:

a) the proposed plan

b) the monitoring agency

c) the scope of the monitoring program

d) the reporting responsibility

The EIS should identify the types of project impacts that may require monitoring and the types of information that will provide a suitable baseline for that monitoring. The utility and limitations for an effective monitoring program based upon the availability of information should also be discussed.

10.0 SUMMARY

The summary should allow a reviewer to obtain both a concise idea of the contents of the EIS and to focus on items of specific interest. It should be understandable to the general public and lend itself to easy use by those requiring a rapid appraisal of the situation. It should include:

a) a brief description of the selected Project proposal (Slave River Hydroelectric Project) and its proposed location;

b) a brief explanation of why the Project is being proposed;

c) a concise evaluation of any alternatives considered;

d) a concise summary of the major natural environmental and social conditions in the area which may affect or be affected by the Project;

e) a description of the probable major natural environmental and social impacts, the mitigation measures to be implemented and a statement on the significance of any unmitigated residual effects.

A summary of any other expected impacts should be provided and any limitations in the EIS created by information deficiencies should be identified.

11.0 APPENDICES

To be included as Appendices to the Environmental Impact Statement are:

a) a glossary of all technical and scientific terms used which may not be readily understandable by the public;
b) lists of references cited and literature used but not cited;
c) reports developed from studies associated with the evaluation.